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Study of vascular wall flora of Janjgir-Champa district, Chhattisgarh

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Abstract

The purpose of the study was to assess the seasonal vascular wall floristic composition of the city of Janjgir-Champa district (C.G.). A total of 105 species of vascular wall flora were documented, of which only two were represented by pteridophytes. In the college Campus, no gymnosperm species were found as wall flora. 83 Genera from 34 different families represented the Angiospermic wall flora. Janjgir-Champa city's wall flora belonged to the Asteraceae, Poaceae and Amaranthaceae families. Majority of non-woody wall flora emerges in rainy and winter seasons | Janjgir-Champa town had mostly woody perennials like *Ficus benghalensis*, *Ficus religiosa*, *Ficus glomerata* and *Ficus racemosa*.

Keywords: Angiospermic flora, Janjgir-Champa city, escape flora, vascular flora, wall flora

1. Introductions

The Janjgir-Champa district is bounded by East longitudes of 82°17' to 83°19' and by North Latitudes of 21°40' to 22°15'30" having geographical area of 4467 sq. km. and is surrounded by Raigarh and Raipur district in South, Bilaspur district in west, Korba and Raigarh district in North and East respectively. The district headquarters Janjgir and Champa- the twin towns are well connected with roads as well as rail. National highway No. 200 passes through both the towns. Janjgir is 180 km from Raipur, 75 km from Bilaspur and 94 km from Raigarh. Both Janjgir and Champa are connected with Howrah and Mumbai by SECR Mumbai- Nagpur - Howrah main line. There is a good network of State Highways in the district.

Walls are artificial habitats created by humans. The walls with cracks and crevices often help plant species grow and develop. Wall plants are the result of spontaneous colonization without the help of humans. Several studies have been conducted to analyze the floristic composition of the wall habitats in India and abroad (Salisbury, 1920; Rishberth, 1948; Varshney, 1967, 1971; Singh and Choudhary, 1975; Singh *et al.* 1979; Sahu, 1984; Pangtey and Rawat, 1987; Brandes, 1995; Krigas *et al.* 1999; Chhetri, 2008 and Nedelcheva, 2011) [1-12].

Walls may be generally categorized into 5 types (i) brick cement wall (ii) stone cement wall (iii) brick mud wall (iv) stone mud wall; and (v) mud wall. In the brick cement wall and stone cement wall, the cementing material used is cement, while in the brick mud wall and stone mud wall the cementing material used is mud. The mud wall is purely made of mud.

2. Materials and Methods

2.1 Site description

The Janjgir-Champa district is bounded by East longitudes of 82°17' to 83°19' and by North Latitudes of 21°40' to 22°15'30" having geographical area of 4467 sq. km. and is surrounded by Raigarh and Raipur district in South, Bilaspur district in west, Korba and Raigarh district in North and East respectively.

District Janjgir-Champa has a typical continental type of climate as it is located far off from the nearest ocean - The Indian Ocean. It has monsoonic type of climate with hot-moist summer and dry winters.

The rise of temperature was noted from February to May. In the month of June when under the influence of monsoon winds, monsoon break results, the temperature starts decreasing.

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In June the average monthly temperature decreases. A further decline in the average temperature trend was recorded in July, due to a little stabilised type of environment. In the month of October temperature further falls. The decline in temperature continues in the months of November and December. Relative humidity was lowest in the months of May and June while it was observed higher during the months of July to September.

2.2 Field observation

An extensive field study was conducted from July 2022 to

June 2023 to record the vascular flora growing on the walls of the campus of Janjgir-Champa city. One visit was made after every two months. Thus a total of six visits were made for the field observations in a year. The identification of plant species was done using taxonomic literatures (Hooker, 1875-1897 and Duthie, 1903-1922) [13, 14].

3. Results and Discussion

The vascular wall flora of the Janjgir-Champa city along with their habit and seasonal appearance is depicted in the Table 1.

Table 1: Vascular wall flora of the city Janjgir-Champa (M.P.), India

S. No.	Family/ plant species	Habit	Seasonal appearance
I	Acanthaceae		
1.	<i>Justicia diffusa</i> Willd.	Herb	Winter
2.	<i>Justicia simplex</i> D. Don	Herb	Winter
3.	<i>Peristrophe bicalyculata</i> Nees	Herb	Winter
4.	<i>Rungia parviflora</i> Nees	Herb	Winter
II	Aizoaceae		
1.	<i>Trianthema portulacastrum</i> L.	Herb	Rainy
III	Amaranthaceae		
1.	<i>Achyranthes aspera</i> L.	Herb	Whole year
2.	<i>Aerva lanata</i> (L.) Juss. Ex Schult	Herb	Summer
3.	<i>Alternanthera sessilis</i> R. Br.	Herb	Rainy & Winter
4.	<i>Amaranthus spinosus</i> L.	Herb	Rainy & Summer
5.	<i>Amaranthus viridis</i> L.	Herb	Summer
6.	<i>Celosia argentea</i> L.	Herb	Winter
7.	<i>Digera arvensis</i> Forsk.	Herb	Rainy & Summer
IV	Asclepiadaceae		
1.	<i>Calotropis gigantea</i> (L.) R. Br.	Shrub	Whole year
2.	<i>Calotropis procera</i> (Ait.) R. Br.	Shrub	Whole year
V	Asteraceae		
1.	<i>Ageratum conyzoides</i> L.	Herb	Summer
2.	<i>Blumea aromatica</i> DC.	Herb	Rainy
3.	<i>Blumea eriantha</i> DC.	Herb	Summer
4.	<i>Blumea indica</i> Linn.	Herb	Summer
5.	<i>Eclipta alba</i> Hassk	Herb	Rainy
6.	<i>Parthenium hysterophorus</i> L.	Herb	Rainy
7.	<i>Sonchus arvensis</i> L.	Herb	Winter
8.	<i>Sonchus oleraceus</i> L.	Herb	Winter
9.	<i>Tridax procumbens</i> L.	Herb	Summer
10.	<i>Vernonia cinerea</i> (L.) Less.	Herb	Winter
11.	<i>Xanthium strumarium</i> L.	Herb	Rainy
VI	Boraginaceae		
1.	<i>Heliotropium indicum</i> L.	Herb	Winter
2.	<i>Heliotropium strigosum</i> Willd.	Herb	Winter
VII	Capparidaceae		
1.	<i>Cleome viscosa</i> L.	Herb	Rainy
VIII	Chenopodiaceae		
1.	<i>Chenopodium album</i> L.	Herb	Winter
IX	Commelinaceae		
1.	<i>Aneilema nudiflorum</i> R. Br.	Herb	Rainy
2.	<i>Commelina benghalensis</i> L.	Herb	Rainy
3.	<i>Commelina diffusa</i> Burm.	Herb	Rainy
4.	<i>Cyanotis axillaris</i> Schult.	Herb	Rainy
X	Convolvulaceae		
1.	<i>Convolvulus pluricaulis</i> L.	Herb	Summer
2.	<i>Evolvulus nummularius</i> L.	Herb	Rainy
XI	Cucurbitaceae		
1.	<i>Coccinia grandis</i> (L.) Voigt.	Herb	Winter
XII	Cyperaceae		
1.	<i>Cyperus difformis</i> L.	Herb	Rainy
2.	<i>Cyperus iria</i> L.	Herb	Rainy
3.	<i>Kyllinga triceps</i> Rottb.	Herb	Rainy
XIII	Euphorbiaceae		
1.	<i>Euphorbia hirta</i> L.	Herb	Rainy & Winter

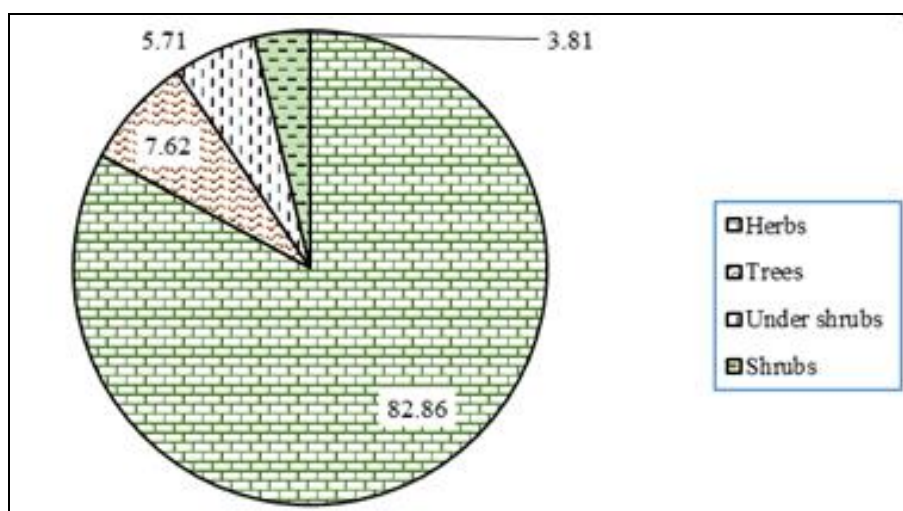
2.	<i>Euphorbia thymifolia</i> L.	Herb	Rainy & Winter
3.	<i>Phyllanthus niruri</i> L.	Herb	Rainy & Winter
XIV	Fabaceae		
1.	<i>Cassia tora</i> L.	Herb	Rainy
2.	<i>Lathyrus aphaca</i> L.	Herb	Winter
3.	<i>Melilotus alba</i> Desr.	Herb	Winter
4.	<i>Melilotus indica</i> All.	Herb	Winter
5.	<i>Mimosa pudica</i> L.	Undershrub	Winter
XV	Lamiaceae		
1.	<i>Hyptis suaveolens</i> (L.) Poir.	Herb	Rainy
2.	<i>Nepeta ruderalis</i> Buch. - Ham.	Herb	Winter
3.	<i>Ocimum canum</i> Sims.	Herb	Winter
4.	<i>Salvia plebeian</i> R. Br.	Herb	Winter
XVI	Lythraceae		
1.	<i>Punica granatum</i> L.	Tree	Whole year
XVII	Malvaceae		
1.	<i>Abutilon indicum</i> (L.) Sweet	Shrub	Rainy & Winter
2.	<i>Corchorus acutangulus</i> Lamk.	Herb	Rainy
3.	<i>Malvastrum tricuspidatum</i> L.	Undershrub	Rainy
4.	<i>Sida acuta</i> Burm. f.	Undershrub	Rainy
5.	<i>Sida rhombifolia</i> L.	Undershrub	Rainy
6.	<i>Urena lobata</i> L.	Undershrub	Rainy
XVIII	Meliaceae		
1.	<i>Azadirachta indica</i> A. Juss.	Tree	Whole year
XIX	Moraceae		
1.	<i>Ficus benghalensis</i> L.	Tree	Whole year
2.	<i>Ficus glomerata</i> Roxb.	Tree	Whole year
3.	<i>Ficus hispida</i> L. f.	Tree	Whole year
4.	<i>Ficus racemosa</i> L.	Tree	Whole year
5.	<i>Ficus religiosa</i> L.	Tree	Whole year
XX	Nyctaginaceae		
1.	<i>Boerhavia diffusa</i> L.	Herb	Rainy & Winter
XXI	Oxalidaceae		
1.	<i>Biophytum sensitivum</i> DC.	Herb	Winter
2.	<i>Oxalis corniculata</i> L.	Herb	Rainy & Winter
XXII	Papavaraceae		
1.	<i>Argemone mexicana</i> L.	Herb	Winter
XXIII	Piperaceae		
1.	<i>Peperomia pellucida</i> (L.) Kunth.	Herb	Rainy
XXIV	Polygonaceae		
1.	<i>Rumex nigricans</i> Hook	Herb	Rainy
XXV	Poaceae		
1.	<i>Chloris virgata</i> Swartz	Herb	Rainy
2.	<i>Cynodon dactylon</i> (L.) Pers.	Herb	Whole year
3.	<i>Dactyloctenium aegyptium</i> Beauv.	Herb	Rainy
4.	<i>Dichanthium annulatum</i> (L.) Stapf	Herb	Rainy
5.	<i>Digitaria marginata</i> Beauv.	Herb	Rainy
6.	<i>Digitaria sanguinalis</i> (L.) Scop.	Herb	Rainy
7.	<i>Echinochloa colonum</i> (L.) Link	Herb	Rainy
8.	<i>Eleusine indica</i> (L.) Gaertn.	Herb	Summer
9.	<i>Eragrostis tenella</i> (L.) P. Beauv.	Herb	Rainy
10.	<i>Eragrostis iscoce</i> Trin.	Herb	Rainy
11.	<i>Eulaliopsis binata</i> (Retz.) C. E. Hubbard	Herb	Winter
12.	<i>Panicum psilopodium</i> Trin.	Herb	Rainy
13.	<i>Setaria glauca</i> (L.) Beauv.	Herb	Winter
14.	<i>Sporobolus diander</i> Beauv.	Herb	Rainy
XXVI	Portulacaceae		
1.	<i>Portulaca oleracea</i> L.	Herb	Winter
2.	<i>Portulaca quadrifida</i> L.	Herb	Winter
XXVII	Primulaceae		
1.	<i>Anagallis arvensis</i> L.	Herb	Winter
XXVIII	Rubiaceae		
1.	<i>Borreria articularis</i> L.	Herb	Rainy
2.	<i>Oldenlandia corymbosa</i> L.	Herb	Winter
3.	<i>Oldenlandia dichotoma</i> Hook.	Herb	Winter
4.	<i>Oldenlandia diffusa</i> Roxb.	Herb	Winter
XXIX	Scrophulariaceae		
1.	<i>Lindenbergia indica</i> (L.) Kuntz	Herb	Rainy

2.	<i>Lindernia crustacea</i> (L.) F. Muell	Herb	Rainy
3.	<i>Scoparia dulcis</i> L.	Herb	Summer
XXX	Solanaceae		
1.	<i>Datura metel</i> Sims.	Undershrub	Rainy
2.	<i>Nicotiana plumbaginifolia</i> Viv.	Herb	Winter
3.	<i>Physalis minima</i> L.	Herb	Rainy
4.	<i>Solanum nigrum</i> L.	Herb	Winter
5.	<i>Solanum xanthocarpum</i> Schrad. & Wendl.	Herb	Rainy
XXXI	Ulmaceae		
1.	<i>Holoptelea integrifolia</i> (Roxb.) Planch	Tree	Whole year
XXXII	Urticaceae		
1.	<i>Urtica dioica</i> Roxb.	Herb	Rainy
XXXIII	Verbenaceae		
1.	<i>Lantana camara</i> L.	Shrub	Whole year
2.	<i>Lippia nodiflora</i> Rich	Herb	Whole year
	Pteridophyte		
XXXIV	Dryopteridaceae		
1.	<i>Dryopteris filix-mas</i> (L.) Schott	Herb	Winter
2.	<i>Adiantum</i>	Herb	Winter

There were 105 vascular plant species observed, of which only two were pteridophytes; the remaining 117 plant species were represented by angiosperms. Janjgir-Champa city's walls have not revealed any Gymnosperm species. 83 Genera from 34 families represented the angiosperms, of which 31 were dicotyledonous and only 3 were monocotyledonous. Of the recorded Angiospermic flora, the most species (14, 13.33%) belonged to Poaceae family, 11(10.48%) to Asteraceae family, and 7(6.67%) to Amaranthaceae family. Thus the study reveals that Asteraceae, Poaceae and Amaranthaceae are the dominant families of the wall flora of the Janjgir-Champa city. Several studies on wall flora suggest the dominance of Asteraceae and Poaceae families (Brandes, 1995; Krigas *et al.* 1999; Chhetri, 2008 and Nedelcheva, 2011) [9-12]. It was observed that mostly the Asteraceae members colonize the walls in winter season while the Poaceae members colonize the same in rainy season. Contrary to these, Amaranthaceae members generally colonize the walls in summer season. Of the total plant species observed, based on the habit, 87(82.86%) were represented by herbs, 8(7.62%) by trees,

6(5.71%) by under shrubs and only 4(3.81%) by shrubs. Therefore, the herbs dominate the wall flora of the Janjgir-Champa city. Plants of herbaceous habits are the chief representatives of wall flora (Brandes, 1995; Chhetri, 2008 and Nedelcheva, 2011) [9, 11, 12].

In the study 40(38.10%), 33(31.43%) and 9(8.57%) plant species were recorded in rainy, winter and summer seasons, respectively on the walls of the University Campus. However, 14(13.33%) plant species were recorded throughout the year on the walls. Furthermore, 7(6.67%) plant species were observed during both rainy and winter seasons. Similarly 2(1.90%) plant species were observed during both rainy and summer seasons on the walls of Janjgir-Champa city. Thus it is evident from the study that most of the flora colonizes the walls during rainy and winter season. The representative wall flora belonging to Commelinaceae and Cyperaceae families exclusively appear on walls in rainy season while the representative flora of Acanthaceae, Boraginaceae and Portulacaceae families exclusively appears on walls in winter season.



Graph 1: Graphics analysis of total plant species observed

4. Conclusion

The study shows that angiosperms dominate vascular flora on the brick cement walls of Janjgir-Champa city. The majority of the flora on the walls appears during the rainy

and winter seasons. The foreign species represent one-fourth of the wall flora. Janjgir-Champa city's vascular wall floristic composition is dominated by the Poaceae,

Asteraceae, and Amaranthaceae families, which are represented exclusively by herbaceous species.

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